"SLEEPING SICKNESS"

BY

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At the beginning of last century Missionaries returning from the West Coast of Africa used to speak of a curious disease called by the natives "*mtansi*", which means to sleep. The first scientific description was given by Winterbottom. Later on, the disease was studied by Dumontier, Santelli and Corre. In 1891 Mackenzie published the record of a case which was under his care in the London Hospital and in 1900, Manson gave a very complete description of two cases sent to London from the Congo. The pathology of these two cases was thoroughly worked out by Mott who was the first to point out that the lesions found were of the nature of a meningo-encephalitis. Lately much attention has been paid to the disease by Marchaux, Le Dantec, Broden, Cook, Hodges, Moffat, the Members of the Portuguese Commission, and quite recently by the first and second Commissions sent out by the Foreign Office and Royal Society in 1902 and 1903. Very important are also the researches of Brumpt and Blanchard.

Until a few years ago Sleeping Sickness was limited to some parts of West Africa and a few districts of the Congo. Lately it has begun to spread very widely up the Niger and the Congo and has suddenly appeared in East Central Africa. Its ravages in Uganda have been appalling.—Sleeping Sickness has been looked upon as a disease of the Negro race exclusively, but Manson and Low have proved that it may occur also in Europeans.

Etiology.—The disease has been considered by some old authors to be a peculiar kind of Malaria, a variety of Beri-Beri, an intoxication, a form of Sunstroke. According to Le Dantec the disease is due to the Anguillula Intestinale, according to Ferguson to the Ankylostoma duodenale. Manson suggested that Filaria perstans might be the cause of the disease. There is no doubt that this theory had many points in its favour, especially as it explained the long incubation period, but the epidemiological researches of Low and Christey have demonstrated that filaria perstans cannot be the direct cause of the disease. Many observers favour a bacterial origin and different forms of germs have been described by Cagigal and Lepierre, Marchaux, Broden. The Members of the Portuguese Commission believe to have found the cause of Sleeping Sickness in a diplo-streptococcus, called by them hypnococcus. According to my experience there cannot be doubt that in a number of cases of Sleeping Sickness a streptococcus infection is frequently present in the very last stage of the malady, but I have come to the conclusion that this streptococcus infection is simply a secondary one. The real cause of Sleeping Sickness in my opinion is the trypanosome. Since November 1902, when I began to use a special technique for the examination of the cerebro-spinal fluid, I frequently observed in it a trypanosome. To obtain good results one must adopt the following technique; by means of lumbar puncture one drains off at least 15 cm. of the cerebro-spinal fluid. It is better to reject the first few cm. as they are apt to contain blood. When the fluid comes away clear 10 cc. are collected and centrifuged for 15 minutes. At the end of this time there is found at the bottom of the tube a slight

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deposit of whitish sediment, and in some cases also a minute trace of blood. The liquid above the sediment is poured off and the sediment examined under a moderately low power of the microscope. As the trypanosomes are at first fairly active they are easily detected. Of 34 cases of Sleeping Sickness examined I found trypanosomes in the cerebro-spinal fluid during life in twenty, giving a rate of a little less than 70 o/o.

On two occasions I also examined in the same way fluid obtained *post-mortem* from the lateral ventricles and in both cases found the same parasites. In the blood among the few cases tested for this purpose I found the trypanosomes once with certainty. In the blood as well as in the cerebro-spinal fluid I have observed several times peculiar bodies which I considered developmental stages of the trypanosome.

In twelve cases of ordinary disease the cerebro-spinal fluid was taken during life by lumbar puncture but in no case did it contain trypanosomes. My results have been amply confirmed by Blanchard, Bruce, Brumpt, Nabarro, etc. Sambon, as soon as he knew of my results, started the hypothesis that the trypanosomes of Sleeping Sickness might be carried by the *glossina palpalis*, a species of Tse—Tse fly. This hypothesis has been proved to be right by the very important experiments of Bruce, Nabarro and Brumpt.

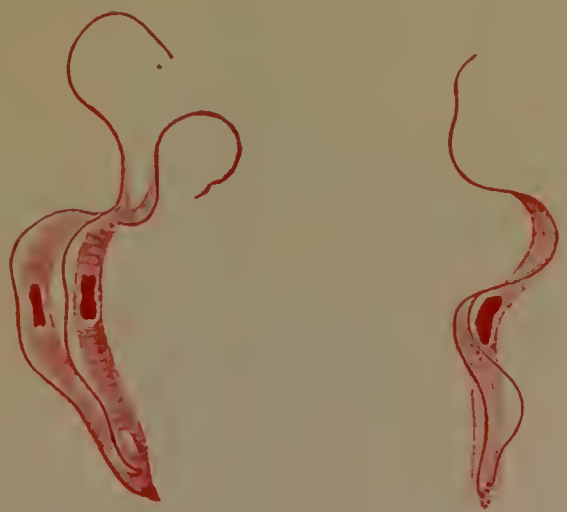
Clinical features of Sleeping Sickness.—I have based the following brief description of the disease on the observations of Low and myself published in the Reports of the Royal Society No. 2, page 14.—Sleeping Sickness presents 3 stages. In the first there are not very characteristic symptoms; only a slight change in the former mental attitude of the patient, and an apparent disinclination to work may be noticed. A symptom, the importance of which in the early diagnosis of the disease was first pointed out by Low and myself, is the presence of fever. The temperature shows very frequently an intermittent type reaching in the evening 101°-102° falling to subnormal in the morning. The pulse is generally of very low tension and frequent, the number of beats varying from 90 to 130 per minute.

The second period might be called, from the most characteristic feature, period of tremor. The tremor is best seen in the tongue and in the hands. It is in this stage that the patient shows the characteristic heavy stupid look, and sometimes drowsiness. The patient complains of headache, and vague pains all over the body. There is slowness in answering questions and when speech does come it is often mumbling and thick. Sometimes he sits down, his eyes closed and he remains in this drowsy condition until again asked some questions. The gait is best expressed by the term shuffling. In this stage, as well as in the first, the spleen is enlarged. Several lymphatic glands also may be enlarged. It is difficult to say whether this enlargement of spleen and glands is to be considered a feature of Sleeping Sickness or not; Low and myself have noticed a similar enlargement in many Natives apparently in good health. In the second and third stage of the disease anæmia in varying amount is constant. The number of the large mononuclear Leucocytes is increased.

In the third period which lasts only 2-4 weeks the pyrexia is no more present, the temperature is often subnormal, emaciation and general weakness become pronounced; the knee-reflexes which were at first somewhat exaggerated become diminished, the motions are passed involuntarily in bed. Saliva often dribbles from the mouth. Drowsiness gradually deepens and the patient can only be roused with difficulty. The patient dies generally in a complete state of coma.

SLEEPING SICKNESS.

Trypanosome of Sleeping Sickness, Adult forms.



Trypanosome of Sleeping Sickness, Division forms.

Trypanosome of Sleeping Sickness, Amoeboid forms.

Glossina Palpalis

Pathological Anatomy.—Macroscopically there is practically nothing to be noted with the exception that the pia-arachnoid is slightly opaque and the cerebro-spinal fluid is in some cases increased. Microscopically the most characteristic feature is a perivascular infiltration of mononuclear Leucocytes in the brain as shown by Mott and Low. The Leucocytic formula of the cerebro-spinal fluid is also mononuclear.

Diagnosis.—The diagnosis in some instances may be exceedingly difficult —especially in early cases. In such cases the simplest way to arrive to a diagnosis is to perform lumbar puncture and examine the cerebro-spinal fluid for trypanosomes by the method already described.

Prognosis.—The disease always terminates fatally. All the cases in our hospital in Entebbe died and we were never able to satisfy ourselves as to rumours of people recovering.

Cure and Prevention.—All sorts of drugs have been tried. So far no reliable treatment has been found. As regards prevention this may be attained by avoiding the bite of the glossina palpalis. Our efforts should tend to destroy this fly. The jungles near the Native villages, where these flies are met with in swarms, should be cleared. The fly-zones should be avoided in building new villages and European settlements.

These are the most practical means to prevent Sleeping Sickness. Another means would be to try—with all due prudence and after complete laboratory researches—the immunisation of Natives who have not yet caught the disease.

Koch, Laveran Mesnil, Rabinowitsh-Kempner and others have tried immunisation against various forms of trypanosomysis in the lower animals— in some cases with fairly good results though never very brilliant. The principle is to pass a strain of trypanosome through different races of animals until it looses a certain degree of its virulence. Koch made the following experiment: he took some blood from an ox affected with Nagana and inoculated a rat with it. The rat died. With this blood a dog was inoculated, he also died. With the blood of the dog Koch inoculated some other dogs, some rats and two calves. The dogs and rats died. The two calves were ill for a certain time showing trypanosomes in their blood; but after a time they recovered and were immune against any new inoculation of infected blood.

Following the same principle the Trypanosome of Sleeping Sickness might be passed through many species of animals until it had lost the most of its virulence. Then one should try to immunize monkeys—and if the results were good the immunisation might be tried on human beings also.